**Objective:** Exploiting 15,896 TRMM and CloudSat/CALIPSO match-up cases within 20 min of each other (30S-30N), we investigated the internal vertical structures and regimes of tropical cloud and precipitation systems.

Note the complimentary and synergistic nature of PR and CPR/CALIOP: together, they almost fill up the entire H-dBZ space.

Four clusters/regimes are identified using k-mean cluster analysis. Comparisons with ISCCP Weather States show broad agreement, but also reveal differences due to different sampling strategies and viewing geometries.